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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,636	03/19/2004	Donald J. Lewis	81100252	1675

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

ED

Office Action Summary	Application No.		Applicant(s)	
	10/805,636		LEWIS ET AL.	
	Examiner		Art Unit	
	Tu M. Nguyen		3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-11, 14-22, 24, 25, 29-31, 33-35 and 51-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-11, 14-22, 24, 25, 29-31, 33-35 and 51-59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :20040319,20040907,20040927,20050826,20060710,20060711,20060925, and 20061218.

DETAILED ACTION

1. An Applicant's Response to Restriction Requirement filed on December 18, 2006 has been entered. Claims 5, 6, 12, 13, 23, 26-28, 32, and 36-50 have been canceled. Overall, claims 1-4, 7-11, 14-22, 24, 25, 29-31, 33-35, and 51-59 are pending in this application.

Election/Restriction

2. Applicant's election without traverse of the species of Figure 15 in the Applicant's Response to Restriction Requirement is acknowledged. Claims 1-4, 7-11, 14-22, 24, 25, 29-31, 33-35, and 51-59 are readable thereon and will be examined in their full merit.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 7-9, 14-20, 24, 25, and 51-59 are rejected under 35 U.S.C. 102(b) as being anticipated by Boyer et al. (U.S. Patent 6,382,193).

Re claims 1, 14, 15, and 51, as shown in Figures 1-4, Boyer et al. disclose a method and a computer readable storage medium having stored data representing instructions executable by a

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computer for determining the number of cylinders and valves to operate in an internal combustion engine with electrically actuated valves (2 valves (18, 20)), the method comprising:

- determining an operating condition (Boosted VDE mode) of the internal combustion engine;
- selecting a number of cylinders (four cylinders) in which to carry out combustion, based on the operating condition;
- determining a number (2 valves (18, 20)) of electrically actuated valves to operate in the selected cylinders;
- selecting a first (intake valve (20)) electrically actuated valve pattern based on the determined number of electrically actuated valves;
- selecting a second (intake-compressed valve (18)) electrically actuated valve pattern based on the determined number of electrically actuated valves; and
- alternately operating the first electrically actuated valve pattern in the selected cylinders during a cycle of the selected cylinders and operating the second electrically actuated valve pattern during different cycles of the selected cylinders (see lines 52-57 of column 4), wherein the different cycles are every other cycle of the cylinders.

Re claim 4, in the method of Boyer et al., the operating condition of the internal combustion engine is a number of fueled cylinder events of the internal combustion engine.

Re claims 7-8, in the method of Boyer et al., the operating condition is a speed or a predicted speed of the internal combustion engine (see Figure 4).

Re claim 9, in the method of Boyer et al., determination of the number of electrically actuated valves is based on the selected number of cylinders.

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Re claim 16, as shown in Figures 1, 2, and 4, Boyer et al. disclose a control method for selecting and controlling cylinders and valves (18, 20) in an internal combustion engine, the method comprising:

- a first mode (Full Cylinder mode) of operation to select and deactivate a first number (zero) of cylinders, and to carry out combustion in the remaining cylinders with a first number (1 valve (20)), of active valves; and

- a second mode (Boosted VDE or VDE mode) of operation to select and deactivate a second number (1 to 4 cylinders or 4 cylinders) of cylinders, and to carry out combustion in the remaining cylinders with a second number (2 valves (18, 20) or 1 valve (20)) of active valves...

Re claim 17, in the method of Boyer et al., the first number of cylinders are zero.

Re claim 18, in the method of Boyer et al., the first number of active valves and the second number of active valves form different valve patterns (in the case of Full Cylinder mode versus Boosted VDE mode).

Re claim 19, in the method of Boyer et al., the first number of active valves and the second number of active valves form the same valve pattern (in the case of Full Cylinder mode versus VDE mode).

Re claim 20, as depicted in Figures 1, 2, and 4, Boyer et al. disclose a method for determining the number of cylinders to operate in an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- determining an operating condition (Boosted VDE mode) of the internal combustion engine;

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- selecting a number (eight cylinders) of cylinders to operate based on the operating condition;
- determining a number (two valves (18, 20) for each firing cylinder and two valves (18, 18) for each non-firing cylinder) of electrically actuated valves to operate in a first (firing cylinders) and a second group (non-firing cylinders) of cylinders located within the number of selected cylinders; and
- operating the number of electrically actuated valves in the first and second group of cylinders during a cycle of the internal combustion engine based on the determination.

Re claim 24, in the method of Boyer et al., the operating condition is a speed of the internal combustion engine.

Re claim 25, in the method of Boyer et al., determination of the number of electrically actuated valves is based on the selected number of cylinders.

Re claims 52-54, as shown in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- operating the engine in a first mode (Boosted VDE mode) with a first number (1 to 4 cylinders) of cylinders deactivated, and a first number of valves (2 valves (18, 20)) operating to carry out combustion in active cylinders; and
- operating the engine in a second mode (VDE mode) with a second number (4 cylinders) of cylinders deactivated, and a second number of valves (1 valve (20)) operating to carry out combustion in active cylinders, where the first number (1 to 4 cylinders) of cylinders deactivated

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is different from the second number (4 cylinders) of cylinders deactivated, and the first number of valves (2 valves) operating is different from the second number (1 valve) of valves operating.

Re claim 55, as depicted in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- operating the engine in a first mode (Boosted VDE mode) with a first number (1 to 4 cylinders) of cylinders deactivated, and a first configuration (both valves (18, 20)) of valves operating to carry out combustion in active cylinders; and
- operating the engine in a second mode (VDE mode) with a second number (4 cylinders) of cylinders deactivated, and a second configuration (valve (20)) of valves operating to carry out combustion in active cylinders, and the first configuration of valves operating is different from the second configuration of valves operating.

Re claims 56-57, in the method of Boyer et al., the first number of cylinders deactivated is the same as or different from the second number of cylinders deactivated.

Re claims 58-59, as illustrated in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- varying a number of deactivated cylinders and varying a number of active valves in active cylinders to regulate engine output during engine operation (see Figure 4 for Boosted VDE mode) (also see lines 45-55 of column 2); and
- varying a number of strokes of a cylinder cycle to further regulate engine output during engine operation (see lines 12-16 of column 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3, 10, 11 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyer et al. as applied to claims 1 and 20, respectively, above.

The method of Boyer et al. discloses the invention as cited above, however, fails to disclose that the operating condition is an engine temperature, a time since start of the internal combustion engine, an engine oil temperature, or a temperature of an electrically actuated valve.

Boyer et al. disclose the claimed invention except for utilizing the parameters such as “engine temperature”, “a time since start of the engine”, “an engine oil temperature”, or “a temperature of an electrically actuated valve” to determine engine torque requirement or engine performance degradation in order to select a number of firing cylinders. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use each of said parameters to select a number of firing cylinders in Boyer et al., since the recitation of such amounts to an intended use statement. Note that each of these parameters is routinely utilized in the art to determine an engine torque demand or engine performance degradation; and the mere selection of each parameter for use in Boyer et al. would be well within the level of ordinary skill in the art.

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7. Claims 29-31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyer et al. in view of Hori et al. (U.S. Patent 6,401,684).

Re claim 29, as illustrated in Figures 1, 2, and 4, Boyer et al. disclose a method for determining the number of cylinders to operate in an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- determining an operating condition (Boosted VDE mode) of the internal combustion engine;
- selecting a number of cylinders (4 firing cylinders) to operate based on the engine operating condition;
- determining a number (two valves (18, 20)) of electrically actuated valves to operate in the selected cylinder based on the number of cylinders; and
- operating the number of electrically actuated valves in the selected cylinder during a cycle of the internal combustion engine based on the evaluation.

Boyer et al., however, fail to disclose that the method further comprises a step of determining an operating condition of at least one of the electrically actuated valves; and that the step of selecting a number of cylinders to operate is further based on the electrically actuated valve operating condition.

As shown in Figure 1, Hori et al. disclose a system for controlling an engine equipped with electromagnetically operated engine valves (2, 3). As illustrated in Figures 11 and 22, Hori et al. teach that it is conventional in the art to monitor and determine an operating condition of the valves; and if a valve is determined to be abnormal, the cylinder having the abnormal valve is deactivated. It would have been obvious to one having ordinary skill in the art at the time of the

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invention was made, to have utilized the teaching by Hori et al. in the method of Boyer et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to reduce engine misfires, emissions, and engine performance degradation due to abnormal valves.

Re claim 33, in the modified method of Boyer et al., the operating condition of the internal combustion engine is a speed of the internal combustion engine.

Re claims 34-35, in the modified method of Boyer et al., the operating condition of the electrically actuated valve is a temperature or an impedance of the electrically actuated valve, as taught by Hori et al.

Re claims 30-31, the modified method of Boyer et al. discloses the invention as cited above, however, fails to disclose that the operating condition of the internal combustion engine is an engine temperature or a time since start of the internal combustion engine.

Boyer et al. disclose the claimed invention except for utilizing the parameters such as “engine temperature” or “a time since start of the engine” to determine an engine torque requirement. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use each of said parameters to determine an engine torque requirement in Boyer et al., since the recitation of such amounts to an intended use statement. Note that both “engine temperature” and “a time since start of the engine” are routinely utilized in the art to determine an engine torque demand; and the mere selection of each parameter for use in Boyer et al. would be well within the level of ordinary skill in the art.

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Prior Art

8. The IDS (PTO-1449) filed on March 19, 2004, September 7, 2004, September 27, 2004, August 26, 2005, July 10, 2006, July 11, 2006, September 25, 2006, and December 18, 2006 have been considered. An initialized copy of each is attached hereto.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of two patents: Ament (U.S. Patent 6,857,264) and Winstead et al. (U.S. Patent 7,143,727) further disclose a state of the art.

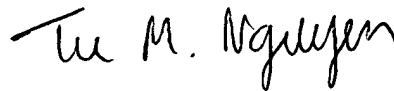
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Communication

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

March 19, 2007

Primary Examiner

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